Inverkan av matlagning som en livsstil för arkitektur i Shanghai

Influence of cooking as a lifestyle on architecture in Shanghai

Wenting Ma

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Abstract

Shanghai is one of the cities that are often considered to be have lost identity in globalization. Importing foreign architecture since 1978 is believed by some experts a key causal factor. According to the critical regionalism identifying typical lifestyle patterns like cooking can be a starting point to find a city identity of Shanghai. This essay is aimed at testing this method. It is approached by learning how cooking influences on architecture (building, street and urban fabric) in ancient, modern, and contemporary times through three relations: cooking and kitchen, kitchen and façade, kitchen and street/urban fabric.

The initial hypotheses of this master thesis were that first importing of foreign architecture causes Shanghai lost identity; second foreign architecture especially residential buildings are hard to adapt to local life without understanding lifestyle; and third cooking as a typical lifestyle pattern can help Shanghai find her character. However, research results show that technique today can offset most of the constraints brought by traditional cooking. Thus, the conclusion of this paper is that influence of cooking on architecture is limited, and to find urban identity should depend on architects’ and stakeholders’ awareness.

Key words

Cooking, kitchen, architecture, Shanghai, globalization, foreign architecture
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1. Introduction

1.1. Background

1.1.1. Importation of foreign architecture in China

History of importing foreign architecture in Shanghai can be traced to the 19th century. Although exportation of architecture is commonly regarded as a part of globalization today, early in the 1940s before the appearance of “globalization” some western countries began to build houses in Shanghai which was a colonial city of them at that time. Regarding to this history, Shanghai has been a “global city” for one century. However, the importation of architecture in Shanghai during the colonial time did not influence local architecture in a large scale for two reasons.

First, at that time, those colonial architectures were not built for local residents but the settlers. All the public buildings like banks, companies, amusements and private houses were located in the concession and served for settlers only. Although in the later colonial time, some Chinese businessmen began to appear in these foreign buildings, most of the local people still had little chance to use them.

Second, after the colonial time, China had experienced an eight-year War of Resistance against Japan, later a four-year civic war, and then the ten-year culture revolution. During those twenty-two years development of architecture in China decayed and the influence brought by foreign architecture in colonial time was cleared. The real shock of foreign architecture was not to come until 1978 when China opened up. Before that time Chinese architecture had been isolated and decayed for almost twenty years from world architecture.

In the worldwide, with architects from America, Japan, and some European counties like the UK, Germany, Netherlands becoming active in the global stage from 1960s on, exportation of architecture began (Xue, 2006). After China open her door to the world in 1978, architects from the above countries came to China immediately. Xue (2006) divided the history of importing foreign architecture in China into three periods in his

The first period is from 1978 to 1990, during when Japanese architects are the pioneers in exporting to China, and then followed Englishmen who come from HongKong together with a few Americans. In this time, the main projects foreign architects do in China are only hotels, and the number is also limited. In the second period which is from 1991 to 2000 architects from Japan are still the largest group though some European architects began to take part in. Foreign architects in second period begin to design some commercial buildings beside public architecture, but number of projects from 1991 to 2000 is still limited.

Things have become different since China joined the WTO (World Trade Organization), from 2001 on, foreign architects and offices became extremely active. Xue (2009) calculated projects designed by foreign architects in the first 7 years in twenty first century and found that the number is almost three times as large as the sum of the other two periods. Moreover, they participate in not only public and commercial projects like they used to, but also some private and even official buildings. It is in this period that foreign architects began to do residential buildings in China. (See figure 1.)

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**Figure 1.** Key figures of Chinese importation of foreign architecture in the three periods. Source: Xue, 2006, p.69 *

All the projects calculated are those designed by architects from Japan, Europe and North America and have already been built. Architects from other countries are too few to be evolved in. *

Importing of foreign architecture promotes Chinese architecture developing. Without the global importation, Chinese architecture would never develop so rapidly. Foreign architects bring advanced technique, new theories, fresh forms and effective management to China as well as training Chinese architects. They help local architects obtain the ability to manage a large project. It pushes Chinese architecture to move on from the negative impact of war and culture revolution.

On the other aspect, importing a great number of architecture directly and indirectly makes the major cities in China like Beijing, Shanghai, and Guangzhou becoming global cities in a short time, on their appearances at least.

Although exporting and importing culture is the tendency of globalization, Xue (2009) in his book points out that it is for other reasons that foreign architectures have such a large market in China. First, for the history as a colony some major cities like Shanghai take those foreign architectures that built during the early colonial time as a symbol of “advance”, thus after half a century, they inherit such reorganization and adore foreign architecture blindly.

Second, local governments and developers believe that the most convenient and effective way to build their cities “global” is to invite the most successful architects in the world. Third and the most important reason however is financial interest. Managing land brings local government and developers great benefit which gives them extreme passion on developing more projects.
1.1.2. Questions the city faces today

Shanghai today has drawn attention of many architects over the world since 1990s. According to the data collected from internet, there has been more than one thousand of architecture companies in Shanghai since 2008 in which oversea companies account almost 10%. The exact figures can be found from internet show that companies from HongKong are the major group whose number is thirty-nine; then the USA has eleven; Canada eight; France seven; Australia six; Japan five; Germany four; Singapore, South Korea and Nordic countries have two companies respectively. Others are hard to recognize their international property.

However, as every leaf has its shadow and bright, together with the positive influence of importing architecture in China is the negative impact. In the external term, Shanghai is often considered to have lost her own identity. Jasper James who is a photographer took a series of city silhouettes with the theme of “Where is My Cities?” and one group is taken in Shanghai (See figure 2).

In front of the global shock after experienced a long period (twenty-two years) of blank in architecture, Shanghai loses her culture property. Just like a baby suddenly grew into an adult in one night. The city that used to have a traditional architectural history for five thousands of years today is full of mass architecture with miscellaneous styles. Various foreign architectures take place of local buildings make up of a veiled city. It finally appearances like any other global cities in the world. (See figure 3)

And in the internal term, some of those international architectures especially residential buildings fail to adapt to local life functionally. It is because lifestyle in Shanghai still keeps traditional that is quite different from western countries. And at the beginning of importing foreign architecture, local architects lack deep understanding of international buildings, and blindly copy them to Shanghai without realizing culture difference. The other reason is foreign architects do not really understand local culture that caused their designs ignoring culture aspects.
Figure 2. Where is my city (James, 2009)? Source: jasperjames.co.uk*

Figure 3. Images of Shanghai in 1990 and 2010 from the same view point. Source: t.sina.com.cn *
1.1.3. Little change on diet tradition

Though the open up impacts a lot on architecture, it has had little effect on lifestyle like diet habits. Take cooking for instance, as long as people in Shanghai live on Chinese food, the cooking habits would never change. To my life experience, cooking habit in Shanghai today is just the same with it in the 1980s (when I borne).

My generation in China who born after the open up considered us adapt to modern lifestyle or in another words western lifestyle entirely. It appears to be true when compared with our parents and grandparents. However, I find it is not as entirely as I supposed to be after experiencing life in Stockholm and travelling to other European cities. I can easily identify myself as a Chinese in any western city not by the appearance but the lifestyle. One of the most different things is cooking habit – use high temperature and prefer frying. As a result I find that a European open kitchen is not suit for Chinese cooking functionally.

Objectively, cooking does count an extremely important role in Chinese culture just like Sun (2000) who is a famous litterateur and historian in contemporary China write in his book Reader China (Yuedu Zhonguo, 2000): “diet is considered to be one of the best activities which can reflect the central concept of Chinese culture – humor and order.” In this book, Sun considered diet as the culture habit that would be most unlikely to change.

The five-thousand years of history may be one reason. The other is that diet has permeated the everyday life. People depend on diet more than any other culture forms like literature or music. As a result external factors like economy and technique which affect architecture a lot have little influence on diet habit.

1.2. Research aim

In the beginning, three initial hypotheses are raised based on the study of background. They are first importing of foreign architecture causes Shanghai lost its identity; second foreign architecture especially residential buildings are hard to adapt to local life without understanding lifestyle; and third cooking as a typical lifestyle can help the
city find her character. These three hypotheses will be tested through analysis.

After as long as thirty years of importing architecture, it is the time for Shanghai to move further and find own identity in the globalization. Followed the concept of critical regionalism, architecture can find its character if it is designed based on the perception of “place” and the perception of place includes “value of the identity of a physical, social and cultural situation” (Liane & Alexander, 2003). In this essay, I am going to test if this method can save architecture from submerging beneath foreign buildings and the “place” here regards to the traditional cooking way.

For diet habit is a stable lifestyle pattern, and so does the cooking way. I take it as a starting point to analyze how cooking as an aspect of lifestyle influence architecture in Shanghai in ancient and modern time and to test if it can still influence architecture today. The analysis is approached step by step through three relations, cooking and kitchen, kitchen and façade, as well as kitchen and street/urban fabric.

The aim is to find the real cause of Shanghai loosing traditions and if cooking as a starting point of architectural design can help find an identity. The three initial hypotheses are raised to guide the research, when results turn to be different they will be revised.
2. Implied theory

2.1. Critical regionalism and region identity

The regional architecture appeared with human civilization and disappeared with technique. The early regionalism developed due to the different properties of regions and different reflections of residents on the physical conditions. Such regional architecture majorly based on the limitation of technique and lack of community in a large scale, human did not obey enough ability to change nature but to comply with it. This situation lasted for thousands of years during when early regionalism created rich and brilliant cultures in different regions.

However, the regionalism regularly disappeared when technique developed as strong as being able to challenge nature. The developing of communication meanwhile accelerated this disappearance. The world tended to be similar everywhere and regions loosed their identity by which they characteristic themselves in globalization.

In such background, concept of critical regionalism was first raised in the early 1980s in Europe by architectural theorist Liane Lefaivre and historian Alexander Tzonis from Greece aimed at “alternating to postmodernism whose ideas and norms were seen as responsible for the numerous failures that characterized most reconstruction and urban renewal project realized since the Second World War” (1981). Later they further advanced this concept and in the book Critical Regionalism (2003) they pointed that architecture should “rethink regionalism within the context of this conflict as a bottom-up approach to design that recognized the value of the identity of a physical, social and culture situation.”

Since the 1990s, more architects and planners awakened to the wonders of the regionalism, and sought not only to emulate them but also to better them, with the help of new techniques. It is more or less a recreation of regionalism activity. The common method of critical regionalism is always spirited from one or more points of the perception of place, and then emphasizes it or them during design. The point is not
limited to any specific model, it depends on the proportion of place, sometimes it is a rainy weather in summer, sometimes is a lake before the site, or one preference of red in local culture etc.

Hadas (2010, pp.227.) claims in his article Evolution and Critical Regionalism that “a structure that is truly suited to a ‘place’ should fit and be accepted into advanced future structural changes”. To my understanding, it means the identification of a structure is defined by the identification of the ‘place’ but architects or planners so it can adapt to that place. At the same time, the structure should follow current technique but the traditions which are out of time.
3. Methodology

3.1. Personal points of departure

One main method adopted in this essay is departing from writer’s personal points. It is based on writer's twenty-four years of life experience in Kunshan, China and five-year academic background in architecture training. The reasons for which choosing Shanghai as a research subject are first, Shanghai is a global city that has been entirely developed. Second, Kunshan is very close to Shanghai, both culture and economic are the same with Shanghai.

3.2. Literature review

Departures of personal views need to be supported by facts statement. Literature studies have been done on social, cultural background of Shanghai, concept of Chinese architecture in ancient, modern and contemporary, concept of Chinese cooking, concepts of component kitchen, concepts and work principle of Tianjin, fire wall, and modern exhaust system.

3.3. Three periods in time

According to social background, history in China is divided into three periods by historians, so does Shanghai. Technique, social environment varied in different periods. Although during the three periods there is little difference in diet culture, the cooking technique developed and influenced kitchen functionally. For this reason, each analysis is made up with three parts: ancient time (before 1840), modern time (1840-1949) and contemporary time (after 1978). To get a better understanding of each period, a background study is to be done on culture and society of three time periods.

What needs to be explained is that, definition of contemporary time in social history of China starts from 1949 when the People's Republic of China was founded. But due to
the importing of foreign architects is begun since 1978 when reform of Chinese economy took place. And this paper focuses on architecture instead of politics, thus, the definition of contemporary here is from 1978 on.

What needs to be noted is that, the residential houses mentioned here refer to those built in Qing dynasty. However, they can stand for ancient civilian houses for the characters of ancient Chinese architecture. To make it tenable a brief introduction on ancient Chinese architecture is stated.

### 3.4. Three relations

In each time period, it is going to study characters of cooking and kitchen at that time as well as the way they affect architecture. The analysis is approached by three progressive relations between cooking, kitchen and street/urban fabric.
1. Cooking and kitchen.
2. Kitchen and façade.

### 3.5. Case study

One case in each time phase is studied after the analysis of three relations. In ancient, the case is a series of survey drawings of a traditional Tianjin house named No.22 house in Xima street. In modern time, the case is a plan of Hongdeli which is a Shiku Men architecture built in 1907. In contemporary, it is Zhenyuan which is completed in January, 2011 in Luodian North Europe Town, Shanghai.
4. Analysis

4.1. Ancient

4.1.1. Background

Architecture in ancient China is an independent and unique structure system. Liang is an architectural historian who edited the first systematic book of Chinese architecture history and also is the most authoritative one in ancient Chinese architecture history so far: Chinese Architecture History (1944). He defined Chinese ancient architecture in this book as a separated and continual system with three major characters.

First, during the whole ancient history, its development has not been influenced by any other culture. Second, the development continual, which means that the principle of structure and lay out stays the same all the time. All changes and developments are carried out step by step and gently. And third Regional style exists. Although basic principle of structure and lay out is fixed, styles varied in regions due to the geography and climate factors.

Regarding to the Liang’s book Chinese Architecture History (1944), civilian houses differ in four regions: Huazhong and Dongbei region, Shanbei region, Jiangnan region and Yunnan region. Shanghai civilian house belongs to Jiangnan region (located in southern east of China) whose form has one main character that different from others: organized with a small inner courtyard named “Tianjin” (means sky well).

In common with other Chinese civilian houses including courtyard dwelling in Beijing (See figure 4), it follows three principles of traditional construction rules: symmetrical, enclosure and spatially arranged around an open space. Tianjin is a kind of inner court and as its name implies, the spatial shape of Tianjin is like a well in sky, however, always with a smaller size than a normal courtyard in order to adapt to the humid weather and higher density in Jiangnan region.
Chinese civilian house has another character that is short standing. When he investigated Chinese residential architecture, no house existed for longer than two hundred years can be found in the whole country while other kinds of architecture like temple can be as old as built in tang dynasty. Sicheng then explained in his book Chinese Architecture History (1944) that Chinese treated their houses just like closes – never expect them to be long standing.

Shanghai has experienced two developments of urbanization, one is in modern time (since 1840) and the other is undergoing today. As a result, Tianjin civilian house is almost disappeared in Shanghai today. Fortunately, there are still some Tianjin houses exist in other cities in Jiangnan region like Wuhan, Yueyang, and Changsha. It explains the reasons for which some implied cases in this essay are in other cities but Shanghai in Jiangnan region. Regarding to the characters of ancient Chinese architecture, they are able to stand for those in ancient shanghai.

![Civilian house (courtyard dwelling) in Qing dynasty, 1644-1911 AC](image1)

![Jia group of Qishan Palace (recovery model) in Zhou dynasty, 2100-256 BC](image2)

**Figure 4.** Comparison of civilian house in Qing dynasty and Zhou dynasty.

Source: SOHUCLUB *

Figure 3 shows two civilian houses in Qing dynasty and Zhou dynasty. Qing is the last dynasty in ancient China while Zhou is the second which is three thousands of years earlier than the former. However, the two civilian houses are almost the same in structure principle and lay out. The only dramatic difference is in ornamentations, the house in Qing is more detailed than that in Zhou.
4.1.2. Cooking and kitchen

Be a Chinese, I live on Chinese food even after coming to Stockholm. But at the first day when I do Chinese cooking in my apartment, I was choked by the oil smoke. What is worse is that a few days later, the whole apartment became greasy. I am confused and try to figure out the reason for those problems never happened in China by the same cooking way. I find that there are two main differences between Chinese kitchen and Swedish kitchen which cause such problems.

1. The kitchen in my apartment is open to other rooms, so oil smoke is easy to spreading through the whole apartment and greases the room.
2. Exhaust fan in kitchen is not as strong as that in China; oil smoke can not be exhausted timely but to stay inside.

1. Kitchen is always separated from other rooms.
Chinese cooking like other Chinese cultures is an independent system; it is also one of the three world cuisine systems while the other two are Turkish and French. One dramatic character of Chinese cuisine is the heating control. Temperature of oil during cooking is divided into ten levels that suit for different cuisine methods. Take frying which is the basic cooking way in Chinese cuisine for example, its ideal temperature of oil should be the eighth level that is 240 °C (zhidao.baidu.com, 2011) during cooking which would produce lots of oil-smoke and make surroundings greasy. To avoid oil-smoke spreading to other room kitchen is always separated.

Moreover, when edible oil (especially vegetable oil) is heated to fry, it would release several harmful chemicals like polycyclic aromatic hydrocarbons and acryl amide that also exist in cigarette and vehicle exhaust (Daily Mail, 10.04.2006). Although thousands of years ago people had no idea about harmful chemicals, they would aware of unpleasant feeling when breathed in too much oil-smoke. Thus, a kitchen was always separated from other rooms in order to reduce the impact of oil-smoke.

2. Kitchen is always closed to Tianjin
However, in a closure space, no matter how far the kitchen separated from other rooms, the smoke would still stagnated inside if it could not be efficiently exhausted. In ancient before electric smoke extractor is invited, how could people solve smoke
exhausting? The answer is Tianjin, an inner courtyard and at the same time a nature exhaust.

The work principle of Tianjin is similar to a chimney. It applies a basic physical principle to practice: principle of pulling smoke. Tianjin’s spatial shape is slender, and eaves of two sides shut down part of the opening space above, it actually is a semi-closed space. Wind can come into Tianjin from the opening above while heat in the bottom can not be eliminated timely but to cumulate downside. As a result air in the bottom is warmer than it above. The temperature contrast and wind forms negative pressure in Tianjin which causes pumping power. The Higher of Tianjin, the stronger of pumping power is. Oil smoke comes to Tianjin from kitchen and then is taken away by pumping power (see Figure 5).

![Figure 5](image)

**Figure 5.** Temperature and wind causes Pumping power that takes away oil smoke in Tianjin and bring fresh air to it.

Fire protection is another reason that kitchen has to be closely connected with Tianjin. At ancient time when naked flame is used in kitchen, it is the very place where fire could break out. There are two main fire protection method used in wood constructions: keep tanks in courtyard – in Tianjin civilian house, fire water is kept in Tianjin to store water and build fire wall (baidu zhidao, 2007). Fire water should be kept near the fire prone place – kitchen.

It is hard to say that the existence of Tianjin is because of kitchen, as the history of Tianjin civilian house is too long to be rooted. Moreover, during the long history,
Tianjin has developed into the spatial center of a house and successes at combining climate, lifestyle, and social system together harmoniously.

Tianjin house is a completely closed construction, bounding walls surround the whole house and with small window on the exterior walls. It separates the interior from outer world both in visual and behavioral terms, Tianjin as an inward open space becomes not only an activation center but also a center of sight. Besides ventilation and keep firewater, Tianjin also undertakes natural lighting, draining, and being a playground. Always, small sized landscape is necessary to decorate the sighting center.

The exact year when Tianjin was first emerged in civilian house can not be confirmed so far. Existing records of Tianjin in literatures can be traced to Jin dynasty (265-420 AD); a poet called Lu Ji (261-303) in his poem Wange (means Monody) portrays about a scene about people watching stars in Tianjin. Other kind of records like Archaeological discoveries can only show the use of courtyard (see figure 4) which is a little different fro Tianjin.

4.1.3. Kitchen and façade

1. wind-fire wall

The main influence of kitchen reflected on façade is wind-fire wall which is one of the two main fire protection methods in ancient wood construction (as mentioned in kitchen and façade section). It is because kitchen is the very place where easily catch on fire. Fire protection of kitchen appears to be important to the whole house.

In ancient Chinese architecture, timber as one of the most common materials is widely used in civilian buildings. Wood is an inflammable material and fire protection technology was imperfect in ancient. Fire is easily happen at that time. More over, in ancient Jiangnan region, cities always have a high density, houses arranged closely. Once one house is on fire, the others are on fire immediately. Just like wind-fire wall’s name implied: the speed of fire is as soon as it of wind. And the wind-fire wall is to prevent fire spreading.

Wind-fire wall is an external wall built by fireproof materials like stone and bricks,
with wood colons hidden inside the wall (Wikipedia, 2011). It is always 500 centimeters higher than the roof, sometimes it could be one meter to two meters higher (see figure 5). On the top of wind-fire wall, arch tiles are used to prevent water erosion and dissociate directions of fire spreading (Qing, 2002). History of wind-fire wall can be traced to Han dynasty (202 BC – 220 AD) in royal palace sand temples and by the Tang dynasty (618 – 907AD) it had been commonly used in civilian houses (Qing, 2002).

2. wind-fire wall has been developed into a decoration element.
Originally, wind-fire wall is mainly used as a fire protection construction. Later, its decorative function is emphasized and regularly takes shape of a unique style. Today, this style in some terms can stand for Chinese architecture.

Wind-fire wall can be divided into different styles regarding to their shapes and ornaments on the top. One of the most well known styles is call horse-head wall. It is well protected in many provinces that belong to Jiangnan region like Anhui, Hubei, and Hunan. It is famous for its horse-head like shape of the top part that higher than house roof (see figure 6). When a series of horse-head wall list along in rules, it generates an overwhelming beauty with cadency.

The existence of wind-fire wall is even longer than the form of Tianjin civilian house – when the form was abandoned in modern time wind-fire wall remained as decoration elements and are widely used in architecture with “back to ancient style”. However, it is not the whole wind-fire wall but the typical shape and part of the typical ornaments contained.
**Figure 6.** Descript of wind-fire wall of Zhen Wanzhan house in Sanxia, Hubei province.

Investigated and drew before it submergied by the Dam of Sanxia.
Source: tgenviron.org *

4.1.4. **Kitchen and street/urban fabric**

A traditional form Tianjin house is closed. It causes isolation between family life and street life. All of the everyday activities in a house are separated within the exterior walls. In such a closed form, Tianjin plays an important role in the influence from kitchen activities to street life.

The spatial sequence of kitchen, Tianjin and street is like closed space to semi-open space to open space. Activities in kitchen first extended to Tianjin, and then spread from Tianjin to street (See figure 7). However, the influence is still limited. The key character of life in Tianjin house is internal.
Figure 7. Illustration of spatial sequence about spatial relations of kitchen, Tianjin and street.

The pattern of house plan in figure 6 is simplified from Ground Floor Plan of No. 22ed House in Xima Street (see figure 11) *

Besides the role that Tianjin plays between kitchen and street, it also helps take shape of unique urban fabric. In cities of Jiangnan region, Tianjin form is a unified form that widely used in civilian houses. No matter low classes or higher classes, as long as they own houses, their forms are similar – single family house and followed the same construction principles. Such unification in construction form takes shape of a unique urban fabric.

One ordinary house owns one central Tianjin, with kitchen and storage room on its two sides, bedrooms and “tang” (which has multifunction as living room, dinning room, meeting room and drawing room) on its northern side and entrance door on the
southern, some times also a back Tianjin behind Tang with service rooms, they
together made up a complete enclosure form with an central axis: entrance door-
Tianjin-tang-back Tianjin. Tianjin (not including back-Tianjin) was a spatial center of
this enclosed construction while “tang” was the spiritual center. A complete
construction with one “tang” was also called “jin” in Chinese architectural
terminology, it was a basic unit that formed large houses and city mechanism.

However, number of rooms in one unit is limited. A large family always needs a group
of units to form a combination. Basic compound methods are “front to back mode”
and “side by side mode” (See figure 7). Compound modes are flexible and the basic
methods can be mix used to form different shapes in order to adapt to its specific
condition of site. In general, a low class familiar can afford one to two units while
number of units in a familiar with higher social status is without limit.

In Yueyang (a city in Jiangnan region), there exists a civilian house originally built by
Guyin Zhang who is a government official in Hongwu, Ming dynasty about six
hundreds years ago which now have been listed as a cultural relics protection units of
Hunan province. The house contains as many as sixty-four units (rednet.cn, 2011)
shows that the Zhangs are a huge family in that time and has a high social status.

The unification of house form with Tianjin as its spatial center and the flexible
compound modes together take shape of the unique urban fabric in ancient Shanghai,
Jiangnan region, China. The former makes sure that the urban fabric is unified in the
whole scale while the different compound modes can make the fabric rich at changing
details. In another word, the urban fabric of ancient Shanghai is based on both two
preconditions; once one of them is abandoned the fabric would be destroyed.
**Figure 8.** Compound modes of units. The combined units in middle show the “front to back mode” while units on the right are combined with “side to side mode”.

The pattern of unit in figure 8 and figure 9 is simplified from Roof Plan of No. 22ed House in Xima Street (See figure 10) *

**Figure 9.** A series of units formed unique urban mechanism
4.1.5. Case study

No. 22ed House in Xima Street
For Tianjin civilian houses are almost disappeared in Shanghai, the case I used in this section is from Wuhan (a city belongs to Jiangnan region). However, the existence of Tianjin house in Wuhan is also worrying. Urbanization development is undergoing in Wuhan that numbers of Tianjin houses are pulled down to make place for new buildings.

It is in the spring of 2008, when I was a bachelor student in architecture, my university at that time - Wuhan University of Technology - was asked by the planning department of Wuhan municipality to survey and map one Tianjin civilian house – No. 22ed House in Xima Street in Wuhan city before it was going to be turned down next year. The exact history of this house was hard to confirm, it was just one of the ordinary houses with only one unit handed down generations by generations. By the time we surveyed, the house was in a quite terrible condition. It had been portioned by four different families; some rooms had been changed and added in order to suit modern lifestyle. However, the main structure and layout was still well maintained.

Main loading structure of No. 22ed House in Xima Street is traditional column and tie construction. Timber columns and beams (See figure 12) are still in good condition (See figure 13). Wind-fire walls on the side elevations (See 1-1 section in Figure 12) are well contained. They are built by bricks and with few windows opened on the exterior walls. However, the wind-fire walls of No. 22ed House in Xima Street are simple constructed without any ornaments.

The No. 22ed House in Xima Street is divided by four families. However, the four families are with no relations to the original house builder. It is not surprised that during the war years and the culture revolution, numerous of houses are lost their owners. They were later divided to poverties who could not afford their own houses. Family A, B, and C share one entrance while family D has its own entrance. The Tianjin, Tang, toilet, and kitchen are public facilities that shared by the four families.
According to the lay out of housing plan it used to be a single family house with single unit for there is only one Tang and one Tianjin on the central axis (See figure 11). The other Tang of family D which is not on the axis is probably changed from an ordinary room after a separate entrance is opened for family D. The rooms (two rooms, one storage room and one Tang) behind central Tang (See figure 11) are auxiliary rooms for they are separated from central axis. It is not common in Tianjin houses. Thus, when simplify roof plan of No. 22ed House in Xima Street to basic sample of unit (See figure 10), they are not included.

Kitchen is next to Tianjin. The shape of Tianjin in No. 22ed House in Xima Street is slender like a chimney (approximate with one meter in width and four meters in height). It favors forming pumping power to achieve ventilation. However, the current situation of Tianjin in this house is not positive as it is stacked with junks.

**Figure 10.** Roof plan of No. 22ed House in Xima Street

Figure 11. Ground Floor Plan of No. 22ed House in Xima Street

The red dotted line shows the central axis with Tang, Tianjin and main entrance on it.
Analyzed by Ma, 2011. *
Figure 12. 1-1 section and 2-2 section of No. 22ed House in Xima Street
Analyzed by Ma, 2011*
**Figure 13.** Current condition of timber column and beam in No. 22ed House in Xima Street.

**Figure 14.** Current condition of Tianjin in No. 22ed House in Xima Street.

Photos of figure 13 & 14 are taken by Zhu, 2008.*

### 4.2. Modern

#### 4.2.1. Background

1. Change of social environment caused alternating of civilian houses

   For centuries Chinese continue their traditional lifestyle and inherit ancestors’ housing form generations by generations until the isolated culture was broken up at 1840. From then on, in some coastal cities where westerners established concessions like Shanghai, new civilianization was introduced in and shocked local culture. The status of Tianjin as a spatial center of the house was gradually cracked down with changing of lifestyle. Tianjin civilian houses were replaced by new house forms regularly.

   However, traditional diet survived in the cultural transforming. And so did the traditional kitchen and the traditional smoke exhausting method - Tianjin. But in the modern house, Tianjin and kitchen were moved backward. Tianjin was no longer the spatial center but an appendage of kitchen and they became a real “kitchen and Tianjin group”. This group still contained for a long time until new technique provide new exhausting ways in 1980s.

   Modern civilian house in Shanghai is called “stone-ringed door” (Shiku Men) today, it grows out from the form of traditional inner court dwelling and modern town house in the UK (Huang, 2006). The emergence of Shiku Men is a result of raising population in Shanghai.

   In 1850s peasants uprising affected Jiangnan region, the armed unrests cause numerous of refugees from Jiangsu and Zhejiang province rushed foreign concessions in Shanghai. In order to housing such great number of people, rows of temporary houses with simple structure and low cost are built and arranged closely to make enough room. This kind of temporary timber houses are considered as the early form
of Shiku Men house.

By the 1870s, with the rapid development of economy in Shanghai, urban population further increased. The early temporary houses in concessions were no long able to satisfy the raising housing request. Moreover, for its timber structure, fire occurred frequently. It soon was replaced by a new style called Shiku Men.

Shiku Men houses contain smaller scale than traditional ones and arranged closer in rows. Traditional Tianjin house is cheap at cost but occupies too much land that is not suit for modern Shanghai which contains a high density while western single family houses are small at occupation of land but cost too much. Shiku Men combines the good points of both forms. Each house for one family with high exterior wall separated from outside, and is popular in mid-classes.

Soon this new form of civilian house spread to other colonial cities in Jiangnan region like Wuhan and Nanjing but with different names: Linong. The colonial time was ended at 1935, and during the sixty-five years Shiku Mens took place of Tianjin civilian became the dominating house style in Shanghai, in 1950 that one year after People's Republic of China established there are 52.6% (12.4 million square meters out of 23.7 million square meters) of civilian housing area in Shanghai were Shiku Men calculated by Shanghai calculation department.

2. Changing of lifestyle influences on Shiku Men house

According to the record in Huang’s (2006) article Characteristic and Vicissitude of Shanghai Residential Quadrangle with Stone-ringed Door (2006), when Shiku Men was first built, it still contained the traditional characters like axis which made up with entrance door, Tianjin, and tang. The early form of Shiku Men was closed as Tianjin house, and the exterior walls were high and with few windows on them.

Later the mid classes who lived in Shiku Men began to pursue new lifestyles as their European neighbors did: having a separate dinning room, car garage, and bath room that were considered to be modern and could help emphasize their social status. With such changing in lifestyle, the closed construction was opened up. High exterior wall which used to separate family life from outer world was replaced by regular bearing
walls. Widows were opened outward. And Tianjin was gradually transformed into a front garden. The lay out of Shiku Men in the late colonial time was moved far away from traditional Tianjin houses.

However, what is embarrassed was that although the mid-classes eagerly learned from their foreign neighbors most of them could not give up traditional diet. And a smoky kitchen was no longer suit for a modern front garden, so it was moved backward. Although Tianjin has been replaced by a western garden, it is still remained in Shiku Men as a back Tianjin. The function of back Tianjin is weakened, it is mainly used to ventilate and natural lighting.

4.2.2. Cooking and kitchen

Cooking way in modern Shanghai remains traditional as it is always traditional from ancient to nowadays. As long as people kept their traditional diet habit, characters of kitchen remain the same. And Tianjin is needed to exhaust oil smoke before new technique emerged to take place of it. However, traditional Tianjin is replaced by front garden which is open and with larger scale. The new open space could not work as a chimney but be seriously impacted by the oil smoke. Kitchen has to be moved backward to locate near back Tianjin.

In spatial sequence, the kitchen-Tianjin-entrance line still remains. On the one hand Tianjin plays a buffer zone between kitchen and other rooms (including front garden) and on the other hand, Tianjin as semi-open space connects kitchen and street.

4.2.3. Kitchen and facade

Wind-fire wall is abandoned in Shiku Mens. In the early temporary form, as it is built in emergence, wind-fire wall is not considered. More or less for this reason, the timber structure always catches on fire and is soon replaces by masonry structure. However, in the new Shiku Men house wind-fire wall is still absent. It is for two main reasons. First, in functional term, the reason for which wind-fire wall is important to a Tianjin civilian house is that Tianjin house is a wooden structure and wind-fire wall is built
with fireproof material to prevent fire spreading. As long as the new Shiku Men is built by masonry that is fire proofed, wind-fire wall looses its functional status.

The other reason is in economic term. Shiku Mens were no longer single occupancy like traditional Tianjin civilian houses. It is built by colonists for renting. Economy benefit is the chief principle. They are constructed in mass and several units (each for one family) linked horizontally as a whole to reduce the cost. As long as the wind-fire wall is no longer important in a masonry construction, it becomes a superfluous element that is abandoned in Shiku Men.

Although being a functional construction wind-fire wall looses its position in Shiku Men houses, being a decoration element it is remained. Ornaments on the top like the horse-head shaped elements were used together with western decorations like arches, stone curves on the main entrance doors of Shiku Men. The entrance door combined decoration elements from wind-fire wall and western stone arch forms a new style called stone-ringed door (Chinese name is Shiku Men) – that was how the name Shiku Men comes.

### 4.2.4. Kitchen and street/urban fabric

2. Communication between kitchen and street is strengthened
In a Shiku Men house, the closed form is broken by the front garden, as a result, communication of family life in Shiku Men and street life is strengthened. Moreover, Shiku Men is a town house form. So the population density in Shiku Men is higher than it in Tianjin house area. It also helps boom the street activities.

3. Modern Shanghai heritages the unique urban fabric from ancient
With changes taking place in house lay out, exterior appearance of roof of the basic unit shifted, the central Tianjin was cut up into front garden and back Tianjin. (See figure 15). Moreover, the compound modes of Shiku Men are appeared to be monotonous compared with those of Tianjin houses. There is only one method to link the units together that is side by side and ranged row by row. Originally there are seven to eight families linked together and by the later colonial time the number doubled
Although the two factors that take shape of urban fabric in ancient Shanghai are both changed in modern time, the basic principle is contained: the fabric is made up with unified units. In this term, the ancient urban fabric is able to be inherited in modern Shanghai. Compared with that in ancient, urban texture in modern is lack of vigor: rows of units arranged in a large scale without changes. (See figure 16). It is like an industrial production.

**Figure 15.** Transformation of unit from Tianjin civilian house to Shiku Men house. The pattern of roof plan of Shiku Men is simplified from bird-eye view of Shiku Mens in figure 16. *
**Figure 16.** Unique urban mechanism shaped by Shiku Mens.

It reflects the high density in Shanghai at that time. Source: guardian.cn *

### 4.2.5. Case study

Hongdeli was constructed in 1907 when the translation of lifestyles in Shanghai was on the way. The lay out of Hongdeli reflects such transition. This house plan is designed for two families (See figure 17, family A and family B). Each family has an individual entrance. From plan lay out, the traditional axis Tianjin – tang – Tianjin was still remained although main entrance is moved away from the axis. But the form of Tianjin is not as closed as it in ancient. Moreover, the scale is extended while the position is no longer in the center. Functionally speaking, it has been alternated to a front garden.

Also kitchen is moved backward. In the first floor plan of family A, there are two kitchens and both of them are linked to the back Tianjin. Back Tianjin in Hongdeli is still remains the characters of Tianjin in ancient: closed and small scaled. These two characters are important for they are preconditions for a Tianjin to formulate heat contrast which can cause pumping power.
The existence of back Tianjin in Hongdeli also shows that by 1907, smoke exhausting is still depend on natural methods. Electronic exhausting machine was not invited at that time.

**Figure 17.** Ground floor Plan and First floor plan of Hongdeli built in 1907, Shanghai.

Source: Huang, 2006 * Edited by Ma*

### 4.3. Contemporary

#### 4.3.1. Background

1. Comparable transformations in civilian house in Shanghai took place

A comparable shift has taken place in civilian house since the open-up in 1978: after Shiku Men replaced single Tianjin house in modern Shanghai as the dominating housing type, centralized high rise houses took place of Shiku Men in a larger scale. There are two main factors which should take responsible for this shifting: population explosion and exporting foreign architecture.
Population of Shanghai increased by five million from 1982 to 2000 (See figure 18), and according to the figures from Shanghai Statistics Bureau, residential population in Shanghai population in Shanghai had reached 19,213,200 in which 5,419,300 were migrations. Urban density was as high as 3030 per square kilometers. Rising of urban population directly increased the demand of housing. The old forms no matter Tianjin house or Shiku Men could not meet the keen demand.

<table>
<thead>
<tr>
<th></th>
<th>Area (km²)</th>
<th>1982-07-01</th>
<th>1990-07-01</th>
<th>2000-11-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shanghai</td>
<td>6,200</td>
<td>11,859,748</td>
<td>13,341,852</td>
<td>16,407,734</td>
</tr>
</tbody>
</table>

**Figure 18.** Number of population of Shanghai in 1982, 1990, and 2000.

Source: city population*


By the early 1980s, a new housing form was exported from western countries into China and soon popularized over the country that is commercial house. The concept of commercial house is new to Chinese before China implement market-direct economy in 1978. Estate developers get land tenure from local municipalities and construct houses for sale. In order to get more economic interests, the common forms of commercial building are high raised flats.

**4.3.2. Cooking and kitchen**

1. New methods of smoke exhausting in buildings.
Cooking way in Shanghai today remains the same with it in ancient. However, the buffer room – Tianjin which used to protect other rooms from smoking impact is disappeared in new flats. Instead new techniques like exhaust fans are invented to help solve smoking problems. At the same time, relevant exhaust systems are needed to be considered in building construction.

In current Chinese architecture, exhaust system is not designed by professional HVAC (heating, ventilating, and air conditioning) engineers but architects. And exhaust
machines are installed by residents; it is hard to control the different power exhaust machines in each family.

Moreover, there is no specific standard about exhaust system buildings in current design criterion but some vague rules. In GB50096-1999 Design Criterion of Dwelling Building 6.4.1, it defines that the average volume of smoke exhausted from kitchen in an ordinary family is 300~500m3/h. GB50368-2005 Criterion of Dwelling House 8.3.7, it just mentions that centralized vertical exhaust system in kitchen should consider about fire prevention and back flow of wind without specific methods.

a) Self-made exhaust system

For cooking ways in European countries are different from those in China, the exhaust machine and exhaust flue in European house is not suit for Chinese. However, at the early period this disparity between foreign kitchen and Chinese kitchen did not attract architects’ attention.

According to the record in Chufang Paiyan Wenti de Sikao (Thinking of Exhausting Problem in Kitchen dui) written by Luo (1994), in the early time when commercial house form was fist introduced in, there was no specific flues for kitchen. As a result, some residents had to change the nearest window into a pipe hole and some directly bored holes on the wall to extend pipes of exhaust machine out of the hole. These actions not only brought much trouble to people but also broke the appearance of façade.

b) Centralized vertical exhaust system in multistoried flats (less than 6 floors)

After realizing the exhaust problem, local architects began to practice new methods. Centralized vertical exhaust system is the main form. In multistoried flats, it is not easy to have back flow of wind, so the request of exhaust flue is not as high as it of high-rise and ultrahigh-rise buildings. Some generalized sizes of exhaust flue are suit for common multistoried buildings.

There are mainly two methods of Centralized vertical exhaust system according to Luo (2004). Method one is to make a flue collection (240mm×240mm) in the exterior wall during construction. Pipe holes with inside diameter of 150 millimeters are prepared to
link sub-pipes of exhaust machine with flue collection in every floor.

Method two is widely used in low-rise flats. It uses PVC (permanent virtual circuits) pipes (inside diameter of 150mm) as the main flue and is installed in the kitchen. This method is easy at construction as only need to prepare a hole with inside diameter of 180mm in the inner corner of the kitchen. Otherwise, the PVC pipe can also be installed outside, and sub-pipes are used to link exhaust machine and main flue.

c) Centralized vertical exhaust system in high-rise and ultrahigh-rise buildings
With the development of urbanism, levels of dwelling buildings have increased from ten in 1990s to thirty in 2000s; some ultrahigh-rise buildings that contain more than forty floors are also emerged (GREEN HUNAN, 2011). Request of exhaust system is also raised along with building’s height.

High-rise and ultrahigh-rise buildings contain more families. In higher stories, back flow of wind and oil smoke is easy to occur for the resisting force in main flues is higher than it in the low levels. Moreover, request of fire prevention of high-rise buildings are stricter than multistoried buildings. As a result, architects have to calculate precisely of the section size of main flues considering the number of families, average exhaust volume, material of the flue, etc.

Xu (2008) who is an engineer in Heating & Ventilating also a professor in HVAC (heating, ventilating, and air conditioning) Institute of Tongji University designed. He developed a kind of flue design software to calculate the section size of flues in centralized vertical exhaust system.

According to the flue design software, architects just need to input the relation design parameters like number of stories, floor height, anticipate exhaust volume, material of flues, expected section size of flues, form of check valve, type of exhaust machine, and probability of using exhaust machine at the same time, it will calculate a table of corresponding exhaust volume of each floor (Xu, 2008). It the calculated volume can not reach the actual request, change the section size of flues and run again.

2. New form of kitchen emerges – compound kitchen
Influenced by open kitchen which is exported from western countries compound kitchen emerges. It combines characters of both closed kitchen and open kitchen – partly closed and partly open. The concept of compound kitchen is first raised by Vanke (the largest estate group in China) and Architecture School in Tsinghua University when they set up a research group working at new kitchens in China in 2002.

Compared with traditional kitchen, compound kitchen has two significant characters, specific functional area and flexible combination. Compound kitchen is divided into four parts regarding to the function of each area that is cooking area, pantry area, dinning area, and washing area (Su, 2002). Cooking area and washing area together belong to polluted area which should be separated. In order to achieve better ventilation (for the power of exhaust machine is limited, the smaller area the better ventilation effect) and grante normal operation, the ideal dimension of polluted area is between four to five square meters (Zhou & Shao, 2003).

Dinning area and pantry area are unpolluted area that can be open and free at forms. Compound kitchen releases dinning area and pantry area from oil smoke that allow people make better use of them. New kitchen wares can be used without worrying them being polluted by oil smoke and environment of dinning area can be improved. The four parts can make up different combinations that can adapt to any house type. (See figure 19)

![Figure 19. Illustration of specific functional areas of compound kitchen in different](image-url)
4.3.3. Kitchen and façade

Façade in new house is free from the influence of kitchen and fire prevention. Technique help solve exhaust problem and fire prevention, façade becomes a separate factor from building construction. The style of façade is no longer limited to traditional style. Influenced by foreign architecture, European style are even more popular in Shanghai.

4.3.4. Kitchen and street/urban fabric

Kitchen in flats is also isolated from street just like it in ancient Tianjin house. However, the latter is because the closed house forms while the former is the result of away from ground.

Common form of commercial house is high-rise flat whose layout is totally different from closed layout with Tianjin. As a result, the unique urban fabric that has existed for thousands of years completely disappeared in the recent thirty years.

4.3.5. Case study

Zhen yuan – Vanke, Shanghai

Zhen yuan is a part of Luodian North Europe Town that developed by Vanke. In 2001, Shanghai set up an urban plan called One City Nine Towns aimed at building nine satellite towns around Shanghai during five years to help relieve the pressure brought by urbanism in Shanghai city. Each town is planned a different theme and luodian is one of them whose style is north Europe and its master plan of Luodian is made by a Swedish company SWECO (See figure 20).

The main house forms of Zhen yuan are five storied buildings. Strictly speaking, buildings in Zhen yuan is more like French (See figure 21). Whatever style it is, there is no Chinese impression in the appearance. Zhen yuan is aimed at mid classes in Shanghai. In order to meet the market its design principle is to be global. The planning, landscape and building facades are all in European style, however, the kitchen keeps
Vanke is a local estate company and they know well about Chinese cooking. The concept of compound kitchen is first raised by them. To meet both requests of cooking demand and market demand, they use compound kitchen in Zhen yuan (See figure 22). The four functional areas are clearly separated, cooking and washing area is closed while pantry area is open. Dinning area is combined with living room which spatially joins kitchen and other rooms into a whole.

**Figure 20.** View of Luodian north Europe town from Meilan lake.

It is a Scandinavia style residential area. Source: Vanke *

**Figure 21.** Master plan of Zhen yuan, Vanke, Shanghai and detailed view of architecture in Zhen yuan. The style of Zhen yuan is French.

Source: Vanke *Edited by Ma, 2011 *
**Figure 22.** Example of compound kitchen used in one flat on the fourth floor.

Source: Vanke * Edited by Ma, 2011 *
5. Conclusion

5.1. Increased speed of development of residential buildings in three time phases

In tracing the stories of kitchen and architecture in Shanghai, I find that the speed of housing development varied dramatically in ancient, modern and contemporary. The difference of time spend on housing development explains the reason for which the traditional form develops into a steady and humorous system while new building forms cause many problems.

In ancient times, the speed is slow and the development is continuous. The Tianjin house form has developed for thousands of years and taken shape in Jin dynasty (according to the earliest record so far). After Jin it has remained for two thousands of years in Jiangnan region until 1840. During the long history, Tianjin house form is separated from other forms and affects on the shaping of street characters and urban fabric.

Speed in modern time is pushed by the importing of foreign architecture. European style comes into Shanghai and help taking shape of a new house form – Shiku Men. The history of Shiku Men in colonial time is seventy-five years (from 1840 to 1935). However, limited by the technical factors, some characters of Tianjin form like Tianjin and closed form is still kept in Shi Men. As a result, the house form, street character and urban fabric formed in ancient do not change a lot in Modern Shanghai.

A rapid speed of urban development takes place after 1978 when the cultural isolation is broken down. The story of modernism in Shanghai is like a speeded-up version of events in Europe. What have taken one century to develop there is compressed into twenty years. Social factors like increasing of population and urbanism, technical factors like electronic exhaust system and advanced structure set off a reform in Chinese residential buildings which also causes an abruption between traditional and
5.2. Decreased influence of kitchen on residential buildings in three time phases

The influence of kitchen in residential buildings in Shanghai is reflected on exhaustion of oil smoke and fire prevention. View it in the three time phases, we find the influence becomes weaker and weaker on buildings and building environment.

In ancient, kitchen is totally melted into the whole house form. Tianjin is to solve mainly the ventilation problem in kitchen and wind-fire wall is for fire prevention. At the same time Tianjin and wind-fire wall are two most typical factors of ancient residential buildings and played a significant role in shaping street character as well as urban fabric. Thus, it can be said that influences of kitchen extend to house form, façade, street character and urban fabric.

Such influences remain in Shiku Men but are weakened especially in the late colonial time. In modern Shanghai, separate of culture is broken and foreign architecture is exported in as well as western life style. The function of wind-fire wall is first taken place by masonry structure, however, it contains as ornaments. Then the closed house form with Tianjin as a spatial center is open up. Tianjin is kept for there is no new exhaust method at that time, but it loses its central status and is moved backward.

Things changed completely in contemporary Shanghai. The emergence of electronic exhaust machine solves ventilation in kitchen and Tianjin finally disappears. Other factors like raising of population, urbanism, and modernism cause that economical house forms take place of the both two storied Tianjin house and Shiku Men. With the disappearance of traditional closed form with a courtyard (it is Tianjin in Tianjin house and garden in Shiku Men), traditional street and urban fabric are no longer existence in Shanghai.

Looking back of the history in kitchen and house form in three time phases we can
find that in the appearance very change of kitchen and house form is caused by importing of foreign architecture. In 1840 it is the first world that breaks the isolation of Chinese architecture while in 1978 it is the open-up policy. However, if we look deeper, it is not hard to find the actual reason behind the appearance, which is the rising of population as well as developing of economy and technique.

Figure 23 lists the differences of house form and kitchen in ancient, modern and contemporary times. It also shows different social background of each time phases which implies the causality. Through the analysis, I find that the story of cooking and architecture is closely related to the social background of that time. Factors like civilianization, land owner, technique, and stakeholders (builders) are all tend to influence it.

<table>
<thead>
<tr>
<th></th>
<th>Ancient (before 1840)</th>
<th>Modern (1840-1949)</th>
<th>Contemporary (after 1978)</th>
</tr>
</thead>
</table>
| Background     | • Agricultural civilization  
                 • Low urban density | • Industrial civilization  
                 • High urban density caused by colonial economy | • Information civilization  
                 • Ultra-high urban density caused by urbanism |
| House form     | Tianjin house         | Shiku Men          | No official definition    |
| Builder        | Individual            | Colonist in concession | Estate developers & local government |
| Characters of residential house | • Single family house  
                 • Two or three storied  
                 • Closed layout with Tianjin | • Town house  
                 • Two or three storied  
                 • Semi-closed layout with back-Tianjin | • Economical flats  
                 • Multistoried, high-rise, and ultrahigh-rise  
                 • Closed layout without courtyard |
<p>| Characters of Kitchen | Closed and separated | Closed and separated | Closed and separated |</p>
<table>
<thead>
<tr>
<th>Exhaust method in kitchen</th>
<th>Natural exhaust with Tianjin</th>
<th>Natural exhaust with Tianjin</th>
<th>Electronic exhaust fans with centralized pipes</th>
</tr>
</thead>
</table>
| Kitchen & street/urban fabric | • Little communion with street  
• Take shape of traditional urban fabric | • Inter communion with street  
• Have relations with traditional urban fabric | • Little communion with street  
• Disappearance of relations with traditional urban fabric |

**Figure 23.** Key characters of residential houses and kitchens as well as different background in the three time phases.

### 5.3. Rethink of hypothesis

As my research results show, I have to rethink the original hypotheses. Regarding to the first hypothesis, importing of foreign architecture is a result of developing of economy and rising of urban density. The traditional Tianjin form which obtains a large area of land is not suit for a high-density city, as a result, concept of town house is imported in and takes shape of Shiku Men together with Tianjin house in modern Shanghai.

With the density in Shanghai keeps rising, even town house form could not satisfy the housing demand, new concept of economical flats is imported. At the same time technique supports the high-rise and ultrahigh-rise buildings which at last take place of traditional architecture in Shanghai. So it is rising of urban density and developing of economy and technique that causes Shanghai loose identity.

As the second hypothesis, as long as foreign architects realize the specific exhaust system in Chinese kitchen, it is not difficult to make residential buildings adapt to local...
life. After all, technique can solve the ventilation problem and fire prevention in kitchen.

When technique can solve ventilation problem and fire prevention in kitchen, these two factors which used to affect Tianjin house and Shiku Men are no longer the constraints to houses today. A specific flue and exhaust machine can offset all the impact caused from them. The influence of kitchen on architecture only reflects on the construction of flues.
6. Further questions

6.1. About developing speed

In comparing with developing speed in three time phases, it is not hard to find a principle that is the more time spent the stronger influence on culture. Tianjin had been completely melt into the whole building system and further influenced on urban fabric through the tow thousands-year of developing. In modern time, the influence of Tianjin still contains. The Shiku Men form which is based on old Tianjin form develops for one century and finally at the end of the colonial time shapes an own character.

Compared with Tianjin and Shike Men form, new architecture in contemporary shanghais are extremely young. The great constructing in Shanghai is considered to be begun from 1990. By 2010, new buildings have completely take place of traditional ones in Shanghai (except some colonial buildings). The new architecture system which made up with high-rise and ultrahigh-rise buildings is established in only twenty years.

Along with the high speed of constructing are the unavoidable low quality and an obvious break with tradition. Problems like lack of considering specific exhaust system in kitchen is one example. Although in the following years it is noticed by designers, there is still no design criterion of exhaust system in residential buildings. Either no specific people so far to design it but architects who are not professional at HVAC.

Generally speaking, the rapid speed of development is a result of rising economy which is out of architects’ control. What architects can do is only keep mind of the value of traditions and to practice them in real projects.

6.2. About traditional heritages

Since cooking can no longer be a constraint to residential building, the traditional elements like Tianjin and wind-fire wall are no longer necessary in today’s architecture.
They used to form the typical architecture in ancient and modern Shanghai and are inseparable the local culture through the thousands of years’ developing. But when come into contemporary time, they are took place by new techniques.

In the technical term, those traditional elements do not have a strong reason to exist in today’s architecture. According to Hadas’s (2010) critic that a structure should be accepted into advanced future structural changes, traditional element like Tianjin and wind-fire wall are not satisfied. Although the traditional Tianjin develops into a stable form it is fragile when facing social reform (rising urban density for example) and new technique. Thus, whether to keep them or not is no longer decided by cooking way but architects’ and stakeholders’ awareness of culture issue.

While from the cultural version, on the one hand the traditional factors like Tianjin and wind-fire wall have identified a traditional culture for thousands of years in Shanghai. It would be a great regret if they disappear today. On the other hand the reason for which they exist in past is their practical function in architecture. Since they have lost the functional meaning, they have no longer strong excuse to remain. What I worried is that in a short time, the traditional elements may be contained by people’s awareness. But in a long term, new culture will be created by new technique and they will take place of the old one day. By that time, what is the likely future of those traditional factors?
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Drawings are drawn by Ma, W.